

ATTORNEY DOCKET NO. KAVIPURAPU 1

PATENT



AP-116

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Applicant: Anil Kavipurapu

Serial No.: 09/826,240

Filed: April 4, 2001

Title: POWER SELECTION SYSTEM FOR USE WITH A  
RECONFIGURABLE CIRCUIT AND METHOD OF  
OPERATING THE SAME

Grp./A.U.: 2116

Examiner: Paul B. Yanchus, III

Mail Stop Appeal Brief-Patents

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ATTENTION: Board of Patent Appeals and Interferences

Sirs:

**APPEAL BRIEF UNDER 37 C.F.R. §41.37**

This is an appeal from a Final Rejection dated November 2, 2005, of Claims 21-40. The Appellant submits this Brief with the statutory fee \$500.00 as set forth in 37 C.F.R. §41.20(b)(2), and hereby authorize the Commissioner to charge any additional fees connected with this communication or credit any overpayment to Deposit Account No. 08-2395.

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This Brief contains these items under the following headings, and in the order set forth below in accordance with 37 C.F.R. §41.37(c)(1):

- I. REAL PARTY IN INTEREST
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I. REAL PARTY IN INTEREST

The real party in interest in this appeal is the Assignee, Agere Systems Inc.

II. RELATED APPEALS AND INTERFERENCES

No other appeals or interferences will directly affect, be directly affected by, or have a bearing on the Board's decision in this appeal.

III. STATUS OF THE CLAIMS

Claims 21-40 are pending in this application and have been rejected under §102(e) or §103(a). Each of the pending claims are being appealed.

#### IV. STATUS OF THE AMENDMENTS

The present Application was filed on April 4, 2001, with Claims 1-20. The Appellant amended independent Claims 1, 8 and 14 in a first Amendment filed on July 2, 2004, in response to a first Examiner's Action mailed April 2, 2004. The Examiner entered the first Amendment and subsequently issued a first Final Rejection on October 12, 2004. The Appellant then filed a Request for Reconsideration on December 10, 2004. In an Advisory Action mailed January 10, 2005, the Examiner maintained the previous rejection of Claims 1-20. The Applicants then filed a Request for Continued Examination (RCE) on February 14, 2005, with a Preliminary Amendment that canceled Claims 1-20 without prejudice or disclaimer and added new Claims 21-40. The Examiner entered the Preliminary Amendment and issued a second Examiner's Action on April 29, 2005, that rejected pending Claims 21-40. The Applicants responded with a second Amendment filed on August 18, 2005, that amended Claims 21, 23, 28, 30, 34 and 37. The Examiner then issued a second Final Rejection on November 2, 2005, rejecting Claims 21-40 under new grounds. On January 3, 2006, the Applicants filed a second Request for Reconsideration. The Examiner responded with a second Advisory Action on January 19, 2006, maintaining the previous rejection of Claims 21-40. The Applicants then filed a Notice of Appeal for Claims 21-40 and a Pre-Appeal Brief Request for Review on February 1, 2006. On February 22, 2006, a Notice of Panel Decision from Pre-Appeal Brief Review was issued indicating that there is at least one actual issue for appeal. Accordingly, the present Appeal Brief was prepared.

## V. SUMMARY OF CLAIMED SUBJECT MATTER

The present invention is directed, in general, to electronic circuits and, more specifically, to a power selection system for use with a reconfigurable circuit and a method of operating the same. (See paragraph 1, page 1.) The present invention takes advantage of the fact that power consumption in a digital circuit is directly related to the frequency of switching of its internal nodes. By monitoring these nodes within the reconfigurable circuit, the power selection circuit takes advantage of operational information readily available and adapts the reconfigurable circuit for different modes of operation. As a result, the flexibility of the reconfigurable circuit is further enhanced to accommodate a multitude of applications. Additionally, the power selection circuit of the present invention may accomplish its intended purpose without employing complex external circuitry such as a microcontroller. (See paragraph 31, page 17.)

Independent Claim 21 is directed to a power selection system for use with a reconfigurable circuit. The power selection system includes: (1) a monitoring circuit configured to determine a transition rate of at least one node located within the reconfigurable circuit and (2) a mode selection circuit coupled to the monitoring circuit and configured to reconfigure the reconfigurable circuit by altering a power characteristic applied to at least a portion thereof based on a comparison between the transition rate and a predetermined operating range. (See paragraphs 19-30, on pages 10-17 and Figures 1-2.)

In one embodiment, a monitoring circuit 205 utilizes edge detector circuits (one of which is designated 210) to discern operating characteristics such as voltage changes in monitored nodes associated with the delay elements D illustrated and described with respect to FIGURE 1. If any monitored node either switches from a high voltage to a low voltage state, or if the monitored node

switches from a low voltage to a high voltage state, then the associated edge detector circuit 210 is triggered and signals an aggregator 220 of this occurrence. (See paragraph 20, pages 10-11.)

In the above embodiment, a mode selection circuit 257 includes first and second operational amplifiers 280, 281, and a selection sub-circuit 290. The first and second operational amplifiers 280, 281, have the same input voltage from the monitoring circuit 205 representing the amount of nodal switching activity of the monitored nodes. The first and second voltage comparator operational amplifiers 280, 281, provide high rail and low rail voltage outputs. A lower rail voltage output means an unacceptably high number of node voltage switch transitions has occurred whereas a high rail voltage means that the number of transitions is not greater than the certain predetermined amount of transitions represented by the high voltage reference 287. (See paragraph 23, page 12 and paragraphs 26-27, pages 14-15.) Based on the high rail and low rail voltage outputs the selection sub-circuit 290 will alter the power characteristics applied to the delay elements D or alter the enablements of the multiplexers MUXs of the reconfigurable circuit 100 illustrated in Figure 1. Thus, the selection sub-circuit 290 can alternatively power down any delay element D or any group thereof and/or selectively enable or disable various multiplexers MUXs. (See paragraphs 28-29, pages 15-16 and Figures 1-2.)

Independent Claim 28 is directed to a method of operating a reconfigurable circuit including: (1) determining a transition rate of at least one node located within the reconfigurable circuit and (2) reconfiguring the reconfigurable circuit by altering a power characteristic applied to at least a portion thereof based on a comparison between the transition rate and a predetermined operating range. (See paragraphs 19-30, on pages 10-17 and Figures 1-2.)

In one embodiment, a transition rate is determined by monitoring nodes associated with the delay elements D illustrated and described with respect to FIGURE 1. If any monitored node either switches from a high voltage to a low voltage state, or if the monitored node switches from a low voltage to a high voltage state, then an associated edge detector circuit 210 is triggered and signals an aggregator 220 of this occurrence. (See paragraph 20, pages 10-11.) A selection sub-circuit 290 may alternatively power down any delay element D or any group thereof and/or selectively enable or disable various multiplexers MUXs through the use of the enabling or disenabling the reference inputs C<sub>b</sub> as described with respect to FIGURE 1. The direct power-up or power-down of the delay elements D, the selective enablement or disablement of the multiplexers MUXs, or reconfiguration signal transmitted to any portion of a reconfigurable circuit allows the power selection system 200 to select the power level for any given time period pulse. (See paragraph 29, page 16.)

Independent Claim 34 is directed to a reconfigurable circuit including: (1) a monitored sub-circuit having (1A) a delay element, associated with a node of the reconfigurable circuit, having a switch, (1B) a multiplier interposed between the node and an output of the reconfigurable circuit and (1C) a power selection system. The power selection system includes a monitoring circuit that determines a transition rate of the node and a mode selection circuit coupled to the monitoring circuit that reconfigures the monitored sub-circuit by altering a power characteristic applied thereto based on a comparison between the transition rate and a predetermined operating range. (See paragraphs 13-18, pages 7-10 and Figure 1.)

In one embodiment, the reconfigurable circuit 100 includes a monitored sub-circuit [e.g., a reconfigurable pseudo random binary sequence (PRBS) generator] 125. In other embodiments, a

reconfigurable circuit may be a filter. The monitored sub-circuit 125 includes delay elements  $D_1$ - $D_N$ , multipliers  $X_1$ - $X_N$  and a power selection system 150. (See paragraphs 13-14, pages 7-8, Figure 1.)

The power selection system 150 includes a monitoring circuit 160 and a mode selection circuit 180. The monitoring circuit 160 continuously counts and stores the number of voltage switches on the nodes  $N$  associated with the delay elements  $D$ . The output from the monitoring circuit 160 is then employed by the mode selection circuit 180. The mode selection circuit 180 either applies a “normal” power mode to the PRBS generator 125 if the mode selection circuit 180 determines that certain operating characteristics of the PRBS generator 125, (i.e., such as those operating characteristics manifested by the nodal switching count) fall within a predetermined range, or the mode selection circuit 180 will apply an “alternative” power mode implemented through such methods as enabling or disabling a multiplexer MUX or powering-down a delay element  $D$ . (See paragraphs 17-18, pages 9-10 and Figure 1.)

Regarding the subject matter of the dependent claims, the above discussion of independent Claims 21, 28 and 34 also includes the subject matter of dependent Claims 23-24, 27, 29-31, 35, 37-38 and 40. Regarding dependent Claims 22, 25-26, 32-33, 36 and 39, in one embodiment the monitoring circuit 205 includes a switching counter or an incremental counter 230. A value of a stored memory of the incremental counter 230 may be increased by a function of the output of an aggregator 220. The aggregator 220 receives signals from the edge detector 210 indicating a voltage transition of a monitored node such that the output of the aggregator 220 may be a function of the sum of all the outputs from the edge detector circuits 210 at any given time. (See paragraphs 20-21, page 11.)

In one embodiment, the power selection system includes a timing circuit 235 having a “wrap-

“around” counter 240 and a comparator 250. The wrap-around counter 240 outputs a signal representing the number of clock cycles received over a given time period that is input into the comparator 250. The monitoring circuit 205 may monitor an operational characteristic for a period of time and the mode selection circuit 257 selects the mode of operation of the monitored circuit by comparing a predetermined operating range to the operational characteristic over the specified time period. (See paragraph 22, pages 11-12 and Figure 2.)

In one embodiment, the mode selection circuit 257 includes a digital-to-analog converter 260, and a sample-and-hold circuit 270. A digital output from the monitoring circuit 205, representing the amount of nodal switching activity of the monitored nodes, is converted to an analog voltage signal by the digital-to-analog converter 260. This analog voltage signal is then input into the sample-and-hold circuit 270. The sample-and-hold circuit 270 samples the analog voltage reading when receiving a time period pulse from the timing counter 235. The sample-and-hold circuit 270 then continues to output this value to the operational amplifiers 280, 281, configured as voltage comparators (hereby referred to as “voltage comparator operational amplifiers”), and will continue to output this value until the next time period pulse. (See paragraphs 23-24, pages 12-13 and Figure 2.)

#### VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The first issue presented for consideration in this appeal is whether Claims 21-25 and 28-32, as rejected by the Examiner, are anticipated in accordance with 35 U.S.C. §102(a) by U.S. Patent No. 5,719,800 to Mittal, *et al.* The second issue presented for consideration in this appeal is whether Claims 26-27 and 33-40, as rejected by the Examiner, are patentably nonobvious in accordance with 35 U.S.C. §103(a) over Mittal.

## VII. APPELLANT'S ARGUMENT

The inventions set forth in independent Claims 22, 29 and 34 and their respective dependent claims are neither anticipated by nor obvious over the references on which the Examiner relies.

### Rejection under 35 U.S.C. 102(b) over Mittal

#### A. Rejection of Claims 21 and 28

Mittal relates to reducing the power consumption of integrated circuits (IC). (*See* column 1, lines 6-7.) Mittal discloses a mode controller 107 that switches a functional unit 105 between a normal mode of operation (typically one with high performance and high power consumption) and a reduced-power mode 102 (typically one lower in performance and lower in power consumption). (*See* column 5, lines 13-30 and Figure 1.) The mode controller 107, however, does not reconfigure the functional unit 105. On the contrary, the mode controller 107 switches to the reduced-power mode by throttling the performance of the functional unit 105. (*See* column 4, lines 19-28.) Throttling the performance does not include **reconfiguring a reconfigurable circuit** but instead involves, for example, lowering an instruction retirement rate or an instruction issue rate. (*See* column 3, lines 14-17.)

Thus, in Mittal, the rates associated with the functional unit change but the **configuration of the functional unit 105 does not change**. Therefore, even assuming the functional unit 107 is a node located within a reconfigurable circuit as asserted by the Examiner, Mittal does not teach reconfiguring the reconfigurable circuit but instead teaches maintaining the configuration of the circuit and reducing power consumption of the circuit by throttling performance thereof. As such, Mittal discloses changing power consumption by altering a rate but does not disclose reconfiguring a

reconfigurable circuit by, for example, altering a rate. Mittal, therefore, does not teach reconfiguring a reconfigurable circuit as recited in independent Claims 21 and 28.

Accordingly, Mittal fails to teach all of the elements of independent Claims 21 and 28 and, therefore, does not anticipate Claims 21 and 28. Thus, the Appellant respectfully requests that the Board of Patent Appeals and Interferences reverse the Examiner's Final Rejection of Claims 21 and 28.

**B. Rejection of Claim 22**

The Examiner has rejected Claim 22 under 35 U.S.C. §102(b) as being anticipated by Mittal. The above argument establishing that Mittal does not anticipate the inventions of independent Claim 21 is incorporated herein by reference. Dependent Claim 22 additionally requires that the monitoring circuit include a switching counter configured to determine the transition rate of the at least one node, and thereby introduces a patentably distinct element in addition to the elements recited in Claim 21. Mittal, however, does not teach a switching counter configured to determine the transition rate of the at least one node but instead discloses an up/down counter that indicates the current utilization of a monitored functional unit. (*See* column 6, lines 13-16.) Thus, Mittal does not teach the subject matter of dependent Claim 22 or the subject matter of dependent Claim 22 in combination with the base claim limitations. Thus, Mittal does not anticipate dependent Claim 22. Accordingly, the Appellant respectfully requests that the Board of Patent Appeals and Interferences reverse the Examiner's Final Rejection of Claim 22.

**C. Rejection of Claims 23 and 30**

The Examiner has rejected Claims 23 and 30 under 35 U.S.C. §102(b) as being anticipated by Mittal. The above argument establishing that Mittal does not anticipate the inventions of

independent Claims 21 and 28 is incorporated herein by reference. Dependent Claims 23 and 30 additionally require that altering the power characteristic is performed by an action selected from the group consisting of: (1) removing power to the at least a portion of the reconfigurable circuit, (2) applying power to the at least a portion of the reconfigurable circuit, (3) enabling the at least a portion of the reconfigurable circuit, and (4) disabling the at least a portion of the reconfigurable circuit. Dependent Claims 23 and 30 thereby introduce a patentably distinct element in addition to the elements recited in Claims 21 and 28. Mittal does not disclose altering the power characteristic is performed by an action selected from the above listed group but instead teaches switching functional units between a high-performance and a low performance. (*See* column 5, lines 25-30.) Mittal, therefore, does not teach the subject matter of dependent Claims 23 and 30 or the subject matter of Claims 23 and 30 in combination with the base claim limitations. Thus, Mittal does not anticipate dependent Claims 23 and 30. Accordingly, the Appellant respectfully requests that the Board of Patent Appeals and Interferences reverse the Examiner's Final Rejection of Claims 23 and 30.

**D. Rejection of Claim 24**

The Examiner has rejected Claim 24 under 35 U.S.C. §102(b) as being anticipated by Mittal. The above argument establishing that Mittal does not anticipate the inventions of independent Claim 21 is incorporated herein by reference. Dependent Claim 24 additionally requires that the monitoring circuit includes at least one edge detection circuit configured to determine a voltage change in the at least one node and the transition rate is based on the voltage change, and thereby introduces a patentably distinct element in addition to the elements recited in Claim 21. Mittal discloses incrementing and decrementing a counter at each clock cycle based on the activity of a functional

unit (see column 6, lines 13-19) but the Appellant does not find where Mittal discloses an edge detection circuit. As such, Mittal does not teach at least one edge detection circuit configured to determine a voltage change in the at least one node and the transition rate is based on the voltage change. Additionally, Mittal does not teach the subject matter of Claim 24 in combination with the base claim limitations. Thus, Mittal does not anticipate dependent Claim 24. Accordingly, the Appellant respectfully requests that the Board of Patent Appeals and Interferences reverse the Examiner's Final Rejection of Claim 24.

E. Rejection of Claim 25

The Examiner has rejected Claim 25 under 35 U.S.C. §102(b) as being anticipated by Mittal. The above argument establishing that Mittal does not anticipate the inventions of independent Claim 21 and dependent Claim 22 is incorporated herein by reference. Dependent Claim 25 depends on Claim 22 and requires, in addition to the elements recited in Claim 21, a timing counter configured to track a period of operation of the reconfigurable circuit and that the switching counter is configured to employ the period of operation to determine the transition rate. The Examiner asserted that a timer is inherent in Mittal. Mittal, however, does not teach a timing counter configured to track a period of operation of a reconfigurable circuit and a switching counter configured to employ the period of operation to determine a transition rate. As discussed above regarding Claim 22, the Appellant does not find where Mittal even discloses determining the transition rate of at least one node but instead is concerned with the activity level of a functional unit. As such, Mittal does not teach the subject matter of Claim 25 or the subject matter of Claim 265 in combination with the base claim limitations. Thus, Mittal does not anticipate dependent Claim 25. Accordingly, the Appellant

respectfully requests that the Board of Patent Appeals and Interferences reverse the Examiner's Final Rejection of Claim 25.

F. Rejection of Claim 29

The Examiner has rejected Claim 29 under 35 U.S.C. §102(b) as being anticipated by Mittal. The above argument establishing that Mittal does not anticipate the invention of independent Claim 28 is incorporated herein by reference. Dependent Claim 29 additionally requires the determining of Claim 28 to include aggregating a number of switching transitions associated with the node. Again, the Appellant does not find where Mittal even determines a number of switching transitions associated with a node. Thus, Mittal does not teach aggregating a number of switching transitions associated with a node or this subject matter of Claim 29 in combination with the base claim limitations. Thus, Mittal does not anticipate dependent Claim 29. Accordingly, the Appellant respectfully requests that the Board of Patent Appeals and Interferences reverse the Examiner's Final Rejection of Claim 29.

G. Rejection of Claim 31

The Examiner has rejected Claim 31 under 35 U.S.C. §102(b) as being anticipated by Mittal. The above argument establishing that Mittal does not anticipate the invention of independent Claim 28 is incorporated herein by reference. Dependent Claim 31 additionally requires that determining the transition rate as recited in Claim 28 is based on a number of voltage changes in the at least one node. Since the Appellant does not see where Mittal discloses determining a transition rate of a least one node, the Appellant does not find where Mittal teaches determining the transition rate is based on a number of voltage changes in the at least one node. Thus, Mittal does not teach each element of Claim 31 individually or in combination with the base claim limitations. Thus, Mittal does not

anticipate dependent Claim 31. Accordingly, the Appellant respectfully requests that the Board of Patent Appeals and Interferences reverse the Examiner's Final Rejection of Claim 31.

H. Rejection of Claim 32

The Examiner has rejected Claim 32 under 35 U.S.C. §102(b) as being anticipated by Mittal. The above argument establishing that Mittal does not anticipate the invention of independent Claim 28 and dependent Claim 29 is incorporated herein by reference. Dependent Claim 32 requires, in addition to the elements of Claims 28 and 29, tracking a period of operation of the reconfigurable circuit and employing the period of operation when determining the transition rate. As discussed above, Mittal does not teach determining the transition rate of at least one node and, accordingly, does not teach tracking a period of operation of the reconfigurable circuit and employing the period of operation when determining the transition rate. As such, Mittal does not teach the subject matter of Claim 32 individually or in combination with the base claim limitations. Thus, Mittal does not anticipate dependent Claim 32. Accordingly, the Appellant respectfully requests that the Board of Patent Appeals and Interferences reverse the Examiner's Final Rejection of Claim 32.

Rejection under 35 U.S.C. 103(a) over Mittal

A. Rejection of Claim 34

The Examiner rejected Claims 26-27 and 33-40 under 35 U.S.C. §103(a) as being unpatentable over Mittal. As discussed above regarding independent Claims 21 and 28, Mittal does not teach reconfiguring a reconfigurable circuit by altering a power characteristic applied to at least a portion thereof based on a comparison between a transition rate and a predetermined operating range. More specifically, Mittal does not even teach reconfiguring a reconfigurable circuit. Additionally,

Mittal does not suggest reconfiguring a reconfigurable circuit since Mittal teaches reducing power consumption of a circuit by throttling the performance of the circuit. (See column 4, lines 19-28.) Mittal, therefore, provides no motivation to one skilled in the art to dynamically control the power utilization of a circuit by reconfiguring the circuit. Thus, Mittal neither teaches nor suggests each and every element of independent Claims 21 and 28.

Mittal, therefore, also does not teach or suggest each and every element of independent Claim 34 which also includes reconfiguring a reconfigurable circuit as recited in independent Claims 21 and 28. Mittal therefore, does not provide a *prima facie* case of obviousness of independent Claim 34. Accordingly, the Appellant respectfully requests that the Board of Patent Appeals and Interferences reverse the Examiner's Final Rejection of Claim 34.

**B. Rejection of Claims 26 and 39**

The Examiner has rejected Claims 26 and 39 under 35 U.S.C. §103(a) as being obvious in view of Mittal. The above argument establishing that Mittal does not teach or suggest each element of the invention of independent Claims 21 and 34 is incorporated herein by reference. Dependent Claims 26 and 39 additionally require that the mode selection circuit include a sample and hold circuit coupled to two voltage comparators and, thereby, introduces a patentably distinct element in addition to the elements recited in Claims 21 and 34. Mittal, however, does not teach or suggest a mode selection circuit including a sample and hold circuit coupled to two voltage comparators in combination with the base claim limitations. Thus, Mittal does not render dependent Claims 26 and 39 obvious. Accordingly, the Appellant respectfully requests that the Board of Patent Appeals and Interferences reverse the Examiner's Final Rejection of Claims 26 and 39.

**C. Rejection of Claims 27**

The Examiner has rejected Claim 27 under 35 U.S.C. §103(a) as being obvious in view of Mittal. The above argument establishing that Mittal does not teach or suggest each element of the invention of independent Claim 21 is incorporated herein by reference. Dependent Claim 27 additionally requires that the reconfigurable circuit is a Pseudo Random Binary Sequence (PRBS) generator and, thereby, introduces a patentably distinct element in addition to the elements recited in Claim 27. Mittal, however, does not teach or suggest the reconfigurable circuit is a PRBS generator in combination with the base claim limitations. Thus, Mittal does not render dependent Claim 27 obvious. Accordingly, the Appellant respectfully requests that the Board of Patent Appeals and Interferences reverse the Examiner's Final Rejection of Claim 27.

**D. Rejection of Claims 33**

The Examiner has rejected Claim 33 under 35 U.S.C. §103(a) as being obvious in view of Mittal. The above argument establishing that Mittal does not teach or suggest each element of the invention of independent Claim 28 is incorporated herein by reference. Dependent Claim 33 additionally requires: (1) sampling and holding an analog representation of the transition rate and (2) comparing a sample of the analog representation to the predetermined operating range. Claim 33, therefore, introduces patentably distinct elements in addition to the elements recited in Claim 33. Mittal, however, does not teach or suggest sampling and holding an analog representation of the transition rate and comparing a sample of the analog representation to the predetermined operating range in combination with the base claim limitations. Thus, Mittal does not render dependent Claim 33 obvious. Accordingly, the Appellant respectfully requests that the Board of Patent Appeals and Interferences reverse the Examiner's Final Rejection of Claim 33.

**E. Rejection of Claim 35**

The Examiner has rejected Claim 35 under 35 U.S.C. §103(a) as being obvious in view of Mittal. The above argument establishing that Mittal does not teach or suggest each element of the invention of independent Claim 34 is incorporated herein by reference. Dependent Claim 35 additionally requires that the monitored sub-circuit include: (1) a plurality of delay elements, associated with a respective node of the reconfigurable circuit, having a corresponding switch and (2) a plurality of multipliers interposed between the one of the nodes and the output of the reconfigurable circuit, wherein the monitoring circuit determines a transition rate associated with at least one of the nodes. Claim 35, therefore, introduces patentably distinct elements in addition to the elements recited in Claim 34. Mittal, however, does not teach or suggest the plurality of delay elements and multipliers as recited in Claim 35 in combination with the base claim limitations. Thus, Mittal does not render dependent Claim 35 obvious. Accordingly, the Appellant respectfully requests that the Board of Patent Appeals and Interferences reverse the Examiner's Final Rejection of Claim 35.

#### F. Rejection of Claims 36

The Examiner has rejected Claim 36 under 35 U.S.C. §103(a) as being obvious in view of Mittal. The above argument establishing that Mittal does not teach or suggest each element of the invention of dependent Claim 22 and independent Claim 34 is incorporated herein by reference. Dependent Claim 36 additionally requires that: (1) the transition rate is based on a total number of switching transitions associated with the switch within a period of operation of the reconfigurable circuit and (2) the monitoring circuit includes a switching counter that determines the number of the switching transitions. Claim 36, therefore, introduces patentably distinct elements in addition to the elements recited in Claim 34. Mittal, however, does not teach or suggest the plurality of delay

elements and multipliers as recited in Claim 36 in combination with the base claim limitations. Thus, Mittal does not render dependent Claim 36 obvious. Accordingly, the Appellant respectfully requests that the Board of Patent Appeals and Interferences reverse the Examiner's Final Rejection of Claim 36.

**G. Rejection of Claims 37**

The Examiner has rejected Claim 37 under 35 U.S.C. §103(a) as being obvious in view of Mittal. The above argument establishing that Mittal does not teach or suggest each element of the invention of dependent Claims 23 and 30 and independent Claim 34 is incorporated herein by reference. Dependent Claim 37 additionally requires that altering the power characteristic is performed by an action selected from the group consisting of: (1) removing power to the at least a portion of the reconfigurable circuit, (2) applying power to the at least a portion of the reconfigurable circuit, (3) enabling the at least a portion of the reconfigurable circuit, and (4) disabling the at least a portion of the reconfigurable circuit. Claim 37, therefore, introduces a patentably distinct element in addition to the elements recited in Claim 34. Mittal, however, does not teach or suggest that altering the power characteristic is performed by an action selected from the above listed group in combination with the base claim limitations. Thus, Mittal does not render dependent Claim 37 obvious. Accordingly, the Appellant respectfully requests that the Board of Patent Appeals and Interferences reverse the Examiner's Final Rejection of Claim 37.

**H. Rejection of Claims 38**

The Examiner has rejected Claim 38 under 35 U.S.C. §103(a) as being obvious in view of Mittal. The above argument establishing that Mittal does not teach or suggest each element of the invention of dependent Claim 24 and independent Claim 34 is incorporated herein by reference.

Dependent Claim 38 additionally requires that the monitoring circuit include at least one edge detection circuit configured to determine a voltage change in the node and the transition rate is based on the voltage change. Claim 38, therefore, introduces patentably distinct elements in addition to the elements recited in Claim 34. Mittal, however, does not teach or suggest the monitoring circuit includes at least one edge detection circuit configured to determine a voltage change in the node and the transition rate is based on the voltage change in combination with the base claim limitations. Thus, Mittal does not render dependent Claim 38 obvious. Accordingly, the Appellant respectfully requests that the Board of Patent Appeals and Interferences reverse the Examiner's Final Rejection of Claim 38.

#### I. Rejection of Claims 40

The Examiner has rejected Claim 40 under 35 U.S.C. §103(a) as being obvious in view of Mittal. The above argument establishing that Mittal does not teach or suggest each element of the invention of independent Claim 34 is incorporated herein by reference. Dependent Claim 40 additionally requires that the monitored sub-circuit is selected from the group consisting of: (1) a Pseudo Random Binary Sequence (PRBS) generator and (2) a filter circuit. Claim 40, therefore, introduces a patentably distinct element in addition to the elements recited in Claim 34. Mittal, however, does not teach or suggest the monitored sub-circuit is selected from the above group in combination with the base claim limitations. Thus, Mittal does not render dependent Claim 40 obvious. Accordingly, the Appellant respectfully requests that the Board of Patent Appeals and Interferences reverse the Examiner's Final Rejection of Claim 40.

For the reasons set forth above, the Claims on appeal are not anticipated by Mittal. Further, the Claims are patentably nonobvious over Mittal. Accordingly, the Appellant respectfully requests

that the Board of Patent Appeals and Interferences reverse the Examiner's Final Rejection of all of the Appellant's pending claims.

Respectfully submitted,

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Dated: April 3, 2006

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## VIII. APPENDIX A - CLAIMS

Claims 1-20 (canceled)

21. A power selection system for use with a reconfigurable circuit, comprising:
  - a monitoring circuit configured to determine a transition rate of at least one node located within said reconfigurable circuit; and
  - a mode selection circuit coupled to said monitoring circuit and configured to reconfigure said reconfigurable circuit by altering a power characteristic applied to at least a portion thereof based on a comparison between said transition rate and a predetermined operating range.
22. The power selection system as recited in Claim 21 wherein said monitoring circuit comprises a switching counter configured to determine said transition rate.
23. The power selection system as recited in Claim 21 wherein said altering said power characteristic is performed by an action selected from the group consisting of:
  - removing power to said at least a portion of said reconfigurable circuit,
  - applying power to said at least a portion of said reconfigurable circuit,
  - enabling said at least a portion of said reconfigurable circuit, and
  - disabling said at least a portion of said reconfigurable circuit.
24. The power selection system as recited in Claim 21 wherein said monitoring circuit further comprises at least one edge detection circuit configured to determine a voltage change in said at least one node and said transition rate is based on said voltage change.
25. The power selection system as recited in Claim 22 further comprising a timing counter configured to track a period of operation of said reconfigurable circuit and said switching counter is configured to employ said period of operation to determine said transition rate.

26. The power selection system as recited in Claim 21 wherein said mode selection circuit comprises a sample and hold circuit coupled to two voltage comparators.

27. The power selection system as recited in Claim 21 wherein said reconfigurable circuit comprises a Pseudo Random Binary Sequence (PRBS) generator.

28. A method of operating a reconfigurable circuit, comprising:  
determining a transition rate of at least one node located within said reconfigurable circuit;  
and

reconfiguring said reconfigurable circuit by altering a power characteristic applied to at least a portion thereof based on a comparison between said transition rate and a predetermined operating range.

29. The method as recited in Claim 28 wherein said determining includes aggregating a number of switching transitions associated with said node.

30. The method as recited in Claim 28 wherein said altering includes performing at least one action selected from the group consisting of:

removing power to said at least a portion of said reconfigurable circuit,  
applying power to said at least a portion of said reconfigurable circuit,  
enabling said at least a portion of said reconfigurable circuit, and  
disabling said at least a portion of said reconfigurable circuit.

31. The method as recited in Claim 28 wherein said determining said transition rate is based on a number of voltage changes in said at least one node.

32. The method as recited in Claim 29 further comprising tracking a period of operation of said reconfigurable circuit and employing said period of operation when determining said transition rate.

33. The method as recited in Claim 28 further comprising sampling and holding an analog representation of said transition rate and comparing a sample of said analog representation to said predetermined operating range.

34. A reconfigurable circuit, comprising:

a monitored sub-circuit, including:

    a delay element, associated with a node of said reconfigurable circuit, having a switch;

    a multiplier interposed between said node and an output of said reconfigurable circuit; and

    a power selection system, including:

        a monitoring circuit that determines a transition rate of said node; and

        a mode selection circuit coupled to said monitoring circuit that reconfigures said monitored sub-circuit by altering a power characteristic applied thereto based on a comparison between said transition rate and a predetermined operating range.

35. The reconfigurable circuit as recited in Claim 34 wherein said monitored sub-circuit comprises a plurality of delay elements, associated with a respective node of said reconfigurable circuit, having a corresponding switch and a plurality of multipliers interposed between said one of said nodes and said output of said reconfigurable circuit, said monitoring circuit determines a transition rate associated with at least one of said nodes.

36. The reconfigurable circuit as recited in Claim 34 wherein said transition rate is based on a total number of switching transitions associated with said switch within a period of operation of said reconfigurable circuit and said monitoring circuit comprises a switching counter that determines said number of said switching transitions.

37. The reconfigurable circuit as recited in Claim 34 wherein said altering said power characteristic is performed by an action selected from the group consisting of:

- removing power to said at least a portion of said reconfigurable circuit,
- applying power to said at least a portion of said reconfigurable circuit,
- enabling said at least a portion of said reconfigurable circuit, and
- disabling said at least a portion of said reconfigurable circuit.

38. The reconfigurable circuit as recited in Claim 34 wherein said monitoring circuit further comprises at least one edge detection circuit configured to determine a voltage change in said node and said transition rate is based on said voltage change.

39. The reconfigurable circuit as recited in Claim 34 wherein said mode selection circuit comprises a sample and hold circuit coupled to two voltage comparators.

40. The reconfigurable circuit as recited in Claim 34 wherein said monitored sub-circuit is selected from the group consisting of:

- a Pseudo Random Binary Sequence (PRBS) generator, and
- a filter circuit.

## IX. APPENDIX B - EVIDENCE

The evidence in this appendix includes Mittal. Mittal was first applied and entered in the record by the Examiner with the second Final Rejection on November 2, 2005.

X. APPENDIX C - RELATED PROCEEDINGS

NONE